Gonorrhea

Gonorrhea is the second most commonly reported notifiable disease in the U.S. Infections due to *Neisseria gonorrhoeae*, like those resulting from *Chlamydia trachomatis*, are a major cause of pelvic inflammatory disease (PID) in the United States. PID can lead to serious outcomes such as tubal infertility, ectopic pregnancy, and chronic pelvic pain. In addition, epidemiologic and biologic studies provide strong evidence that gonococcal infections facilitate the transmission of HIV infection.[1]

From 1975 through 1997, the national gonorrhea rate declined 73.8% following implementation of the national gonorrhea control program in the mid-1970s (Table 1). After a small increase in 1998, the gonorrhea rate has decreased slightly since 1999 (Figure 10 and Table 1). True increases or decreases may be masked by changes in screening practices (affected by simultaneous testing for chlamydia), use of diagnostic tests with different sensitivities, and changes in reporting practices.[2]

For most areas, the number of gonorrhea cases reported to CDC is affected by many factors, in addition to the occurrence of the infection within the population. As with reporting of other STDs, reporting of gonorrhea cases to CDC is incomplete.[3] In addition, reporting practices for gonococcal infections may have been biased towards reporting of infections in persons of minority race or ethnicity, who are more likely to attend public STD clinics.[2,4] In 2002, 35.2% of gonorrhea cases were reported by STD clinics (Table 2). For such reasons, supplemental data on gonorrhea prevalence in persons screened in a variety of different settings are useful in assessing disease burden in selected populations.

- In 2002, 351,852 cases of gonorrhea were reported in the United States (Table 1).
- The rate of reported gonorrhea in the United States was 125.0 cases per 100,000 population in 2002, which was lower than rates for the previous four years (128.5 in 2001, 129.0 in 2000, 132.3 in 1999, and 131.9 in 1998 (Tables 1 and 14).
- As in 2000 and 2001, only 8 states and 1 outlying area had gonorrhea rates below the Healthy People 2010 (HP2010) national objective of 19 cases per 100,000 population[5] for 2002 (Figure 11 and Table 13).
- In 2002, 1,376 (43.9%) of 3,139 counties in the United States had gonorrhea rates at or below the HP2010 national objective of 19 cases per 100,000 population. Rates per 100,000 population were between 19 and 100 in 1,029 counties (32.8%), and greater than 100 in 730 counties (23.3%). The majority of counties with greater than 100 cases per 100,000 population were located in the South (Figure 12).
- As in previous years, in 2002 the South had the highest gonorrhea rate among the four regions of the country. In 2002, the gonorrhea rate in the South declined by 6.1% from a rate of 177.6 per 100,000 population in 2001 to 166.8. The gonorrhea rate in the Northeast also declined by 3.3% from 97.9 in 2001 to 94.7 in 2002. Meanwhile, the gonorrhea rate in the Midwest remained essentially unchanged at

143.9 in 2002. It was 143.4 in 2001. The gonorrhea rate in the West experienced a 6.0% increase over this time period from 61.5 to 65.2 (Figure 13 and Table 14).

- Although rates of gonorrhea among men prior to 1997 were higher than rates among women, rates among men and women have been similar since 1997 (Figure 14). In 2002 the gonorrhea rate among women (125.3 cases per 100,000 females) was similar to the rate among men (124.2 cases per 100,000 males) (Tables 15 and 16).
- The overall gonorrhea rate in selected large cities with populations over 200,000 persons was 220.2 cases per 100,000 population in 2002. This rate has decreased slightly each year since 1998 when it was 241.4 cases per 100,000 population (Table 18). All of these cities had rates higher than the HP2010 objective of 19 cases per 100,000 population. In 2002, 46.1% of gonorrhea cases were reported by these selected cities (Table 17). Similar to previous years, in 2002 the total gonorrhea rate among males in these selected large cities (231.5) remained higher than that among females (208.7) (Tables 19 and 20).
- When examined by age, in 2002 the gonorrhea rate was highest for 20- to 24-year-olds (593.0 per 100,000). Among women in 2002, 15- to 19- and 20- to 24-year-olds had the highest rates of gonorrhea (675.6 and 650.3, per 100,000, respectively); among men, 20- to 24-year-olds had the highest rate (538.1 per 100,000) (Figure 16 and Table 21). Since 1998 there has been a 12.2% decrease in the rate of gonorrhea among 15- to 19-year olds, 10.2% among women and 16.4% among men (Table 21).
- Changes in gonorrhea rates from 2001 to 2002 differed by racial/ethnic group. Gonorrhea rates increased in 2002 for three of the five racial/ethnic groups. The rates among American Indian/Alaska Natives (114.4 per 100,000 in 2001 and 126.8 in 2002), Hispanics (74.2 in 2001 and 76.0 in 2002), and whites (29.4 in 2001 and 31.1 in 2002) increased by 10.8%, 2.4%, and 5.8%, respectively, during this time period. The gonorrhea rate among Asian/Pacific Islanders declined 9.7% in 2002 compared to 2001 (from 26.7 down to 24.1). The rate among African-Americans declined 5.1% from 782.3 in 2001 to 742.3 in 2002, but still remained higher than that among other race/ethnicities (Figure 15 and Table 22B). In 2002, the gonorrhea rate among African-Americans was about 24 times greater than the rate for whites, down from 27 times greater in 2001. The 2002 gonorrhea rates for all racial/ethnic groups were above the HP2010 objective of 19 per 100,000 population.
- Increases in gonorrhea were largest in white men aged 30- to 44-years-old between 1998 and 2002. For white men, rates increased 24.1% in 30- to 34-year-olds, 38.3% in 35- to 39-year-olds and 65.5% in 40- to 44-year-olds (Table 22B).
- As in recent years, the highest rates of gonorrhea were seen among 15- to 19-year-old African-American women (3,307.7 per 100,000), and 20- to 24-year-old African American men (3,256.2 per 100,000) (Table 22B).
- In 2002, the median state-specific gonorrhea test positivity among 15- to 24-year-old women screened in selected family planning clinics in 35 states, Puerto Rico, District of Columbia, and the Virgin Islands was 0.9% (range 0.1% to 2.8%) (Figure 17). In other settings, gonorrhea test positivity has been much higher. See **Special Focus Profiles**.

- Antimicrobial resistance remains an important consideration in the treatment of gonorrhea.[6-8] Overall, 18.0% of isolates collected in 2002 in 27 STD clinics by the Gonococcal Isolate Surveillance Project (GISP) were resistant to penicillin, tetracycline, or both (Figures 18 and 19).
- Resistance to ciprofloxacin was first identified in GISP in 1991. From 1991 to 1998, fewer than nine ciprofloxacin-resistant isolates were identified each year and such isolates were identified in only a few GISP clinics. In 2000, similar to 1999, 19 (0.4%) ciprofloxacin-resistant GISP isolates were identified in 7 GISP clinics. In 2001, 38 (0.7%) ciprofloxacin-resistant GISP isolates were identified in 6 clinics and in 2002, 116 (2.2%) such isolates were identified in 13 clinics (Figure 20).
- In Honolulu, the proportion of GISP isolates that were resistant to ciprofloxacin remained high in 2002 at 11.7%, although this was lower than in the previous two years (20.3% in 2001 and 14.3% in 2000). This high proportion of ciprofloxacin-resistant isolates in Hawaii continues to reinforce the recommendation made by CDC in 2000 that fluoroquinolones not be used to treat gonorrhea acquired in Hawaii.[6]
- In California, significant increases in the proportions of GISP isolates resistant to ciprofloxacin were identified in all 4 California GISP sites (for Long Beach, 7.2% in 2002 compared with 3.0% in 2001; for Orange County, 11.4% in 2002 compared with 2.3% in 2001; for San Diego, 16.5% in 2002 compared with 2.1%; for San Francisco, 6.7% in 2002 compared with 3.4% in 2001). In 2002, the California STD Program recommended that fluoroquinolones no longer be used for gonorrhea treatment in California.
- The proportion of GISP isolates that were ciprofloxacin-resistant at other GISP clinics where such isolates were identified in 2002 were: Anchorage, AL – 3.7%; Seattle, WA – 3.0%; Portland, OR – 1.7%; Philadelphia, PA – 1.0%; Minneapolis, MN – 0.5%; Cincinnati, OH – 0.4%; Miami, FL – 0.4%; Phoenix, AZ – 0.3%. Overall, outside of Hawaii and California, 0.4% of isolates were ciprofloxacin-resistant. Additional information on both GISP data and non-GISP antimicrobial susceptibility data from health departments may be found in the 2002 GISP report[7] and the GISP website (**http://www.cdc.gov/std/gisp**).
- In 2002, no GISP isolates had decreased susceptibility to cefixime or to ceftriaxone. The proportion of GISP isolates demonstrating decreased susceptibility to ceftriaxone or cefixime has remained very low over time. To date, cephalosporin resistance has not been identified in GISP. In 2001, three GISP isolates with decreased susceptibility to cefixime were also found to be resistant to penicillin, tetracycline, and ciprofloxacin; such multi-drug resistance in combination with decreased susceptibility to cefixime has not previously been identified in the United States.[9]
- The proportion of GISP isolates demonstrating elevated minimum inhibitory concentrations (MICs) to azithromycin has been increasing since GISP began monitoring azithromycin susceptibility in 1992. In 1992, 0.9% of GISP isolates had azithromycin MIC ≥0.5 μg/ml compared with 3.1% in 2002. In 1992, there were no isolates with azithromycin MIC ≥1.0 μg/ml but in 2002, there were 33 such isolates.

- From GISP data, the percentage of men with gonorrhea who were reported to have had a gonorrhea infection in the previous year has remained essentially unchanged between 1992 (21.5%) and 2002 (22.5%) (Figure 21).
- Additional information about gonorrhea in racial and ethnic minority populations, adolescents, men who have sex with men, and other at risk populations can be found in the **Special Focus Profiles**.

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[1] Cohen MS, Hoffman IF, Royce RA, et al. Reduction of concentration of HIV-1 in semen after treatment of urethritis: implications for prevention of sexual transmission of HIV-1. *Lancet* 1997;349:1868-73.

[2] Centers for Disease Control and Prevention. Gonorrhea – United States, 1998. *MMWR* 2000;49:538-42.

[3] Sexually Transmitted Diseases in America: How Many Cases and At What Cost? Prepared for the Kaiser Family Foundation by: American Social Health Association, December 1998, ASHA: Research Triangle Park, NC, Kaiser Family Foundation: Menlo Park, CA 94025.

[4] Fox KK, Whittington W, Levine WC, Moran JS, Zaidi AA, Nakashima AN. Gonorrhea in the United States, 1981-1996: demographic and geographic trends. *Sex Transm Dis* 1998;25(7):386-93.

[5] U.S. Department of Health and Human Services. *Healthy People 2010*. 2nd ed. With Understanding and Improving Health and Objectives for Improving Health. 2 vols. Washington, DC: U.S. Government Printing Office, November 2000.

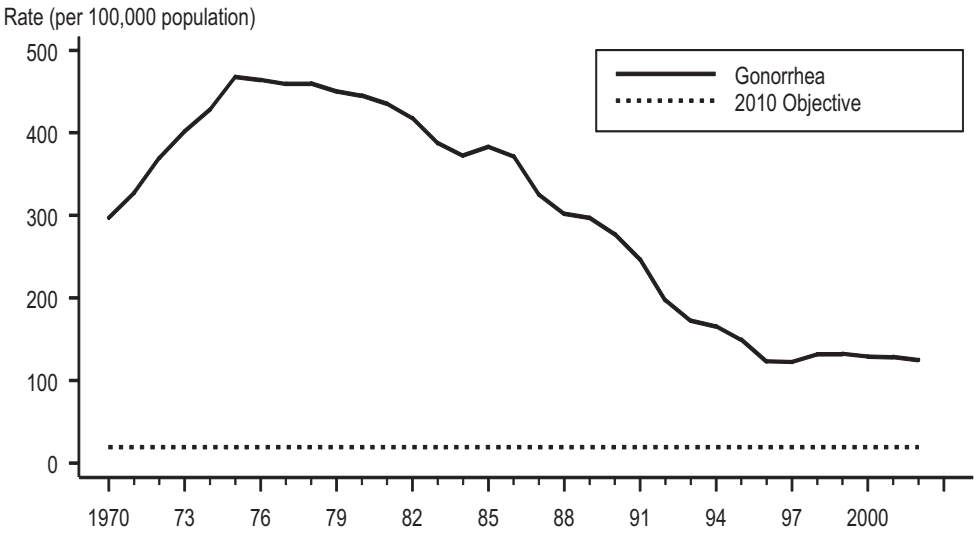
[6] Centers for Disease Control and Prevention. Fluoroquinolone-resistance in *Neisseria gonorrhoeae*, Hawaii, 1999, and decreased susceptibility to azithromycin in *N. gonorrhoeae*, Missouri, 1999. *MMWR* 2000;49:833-837.

[7] Centers for Disease Control and Prevention. *Sexually Transmitted Disease Surveillance 2002 Supplement: Gonococcal Isolate Surveillance Project (GISP) Annual Report 2002*. Atlanta, GA: U.S. Department of Health and Human Services (in press).

[8] Centers for Disease Control and Prevention. Increases in fluoroquinolone-resistant *Neisseria gonorrhoeae*–Hawaii and California, 2001 *MMWR* 2002;51:1041-1044.

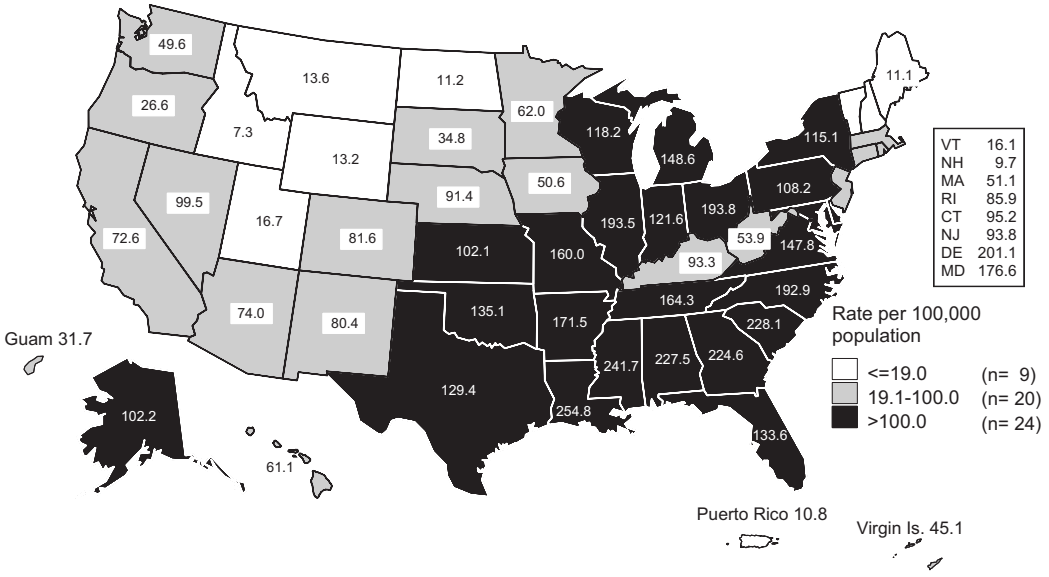
[9] Wang SA, Lee MV, Iverson CJ, O'Connor N, Ohye RG, Hale JA, Knapp JS, Effler PV, Weinstock HS. Multi-drug resistant *Neisseria gonorrhoeae* with decreased susceptibility to cefixime, Hawaii, 2001. [Abstract] International Conference on Emerging Infectious Diseases, Atlanta, Georgia, March 25, 2002.

Figure 10. Gonorrhea — Rates: United States, 1970–2002 and the Healthy People 2010 objective



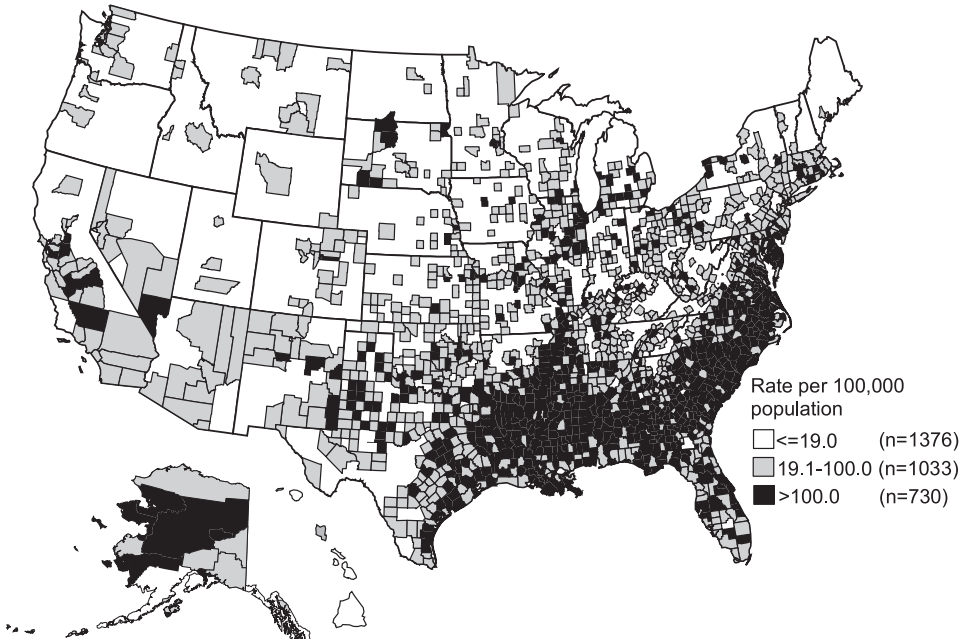
Note: The Healthy People 2010 objective for gonorrhea is 19.0 cases per 100,000 population.

Figure 11. Gonorrhea — Rates by state: United States and outlying areas, 2002



Note: The total rate of gonorrhea for the United States and outlying areas (Guam, Puerto Rico and Virgin Islands) was 123.4 per 100,000 population. The Healthy People 2010 objective is 19.0 cases per 100,000 population.

Figure 12. Gonorrhea — Rates by county: United States, 2002



Note: The Healthy People 2010 objective for gonorrhea is 19.0 cases per 100,000 population.

Figure 13. Gonorrhea — Rates by region: United States, 1981–2002 and the Healthy People 2010 objective

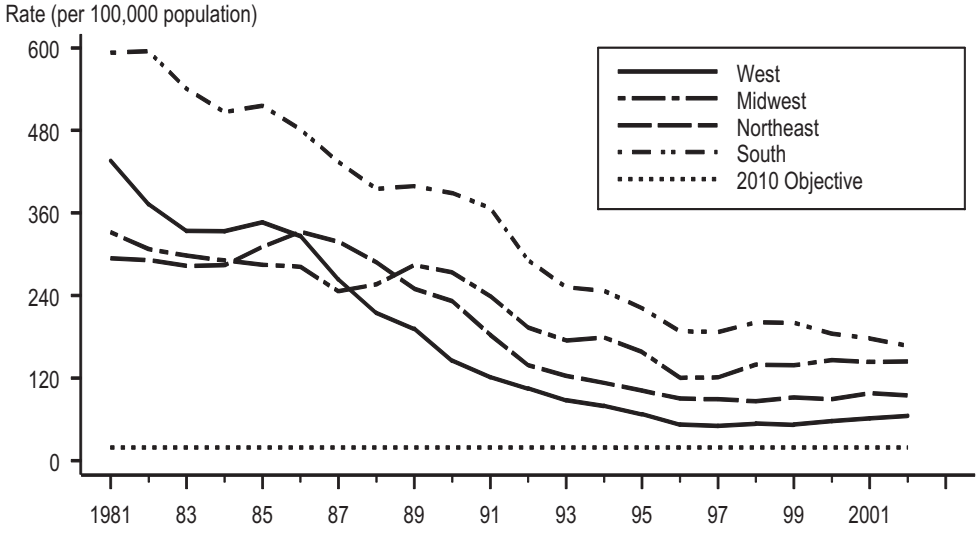


Figure 14. Gonorrhea — Rates by sex: United States, 1981–2002 and the Healthy People 2010 objective

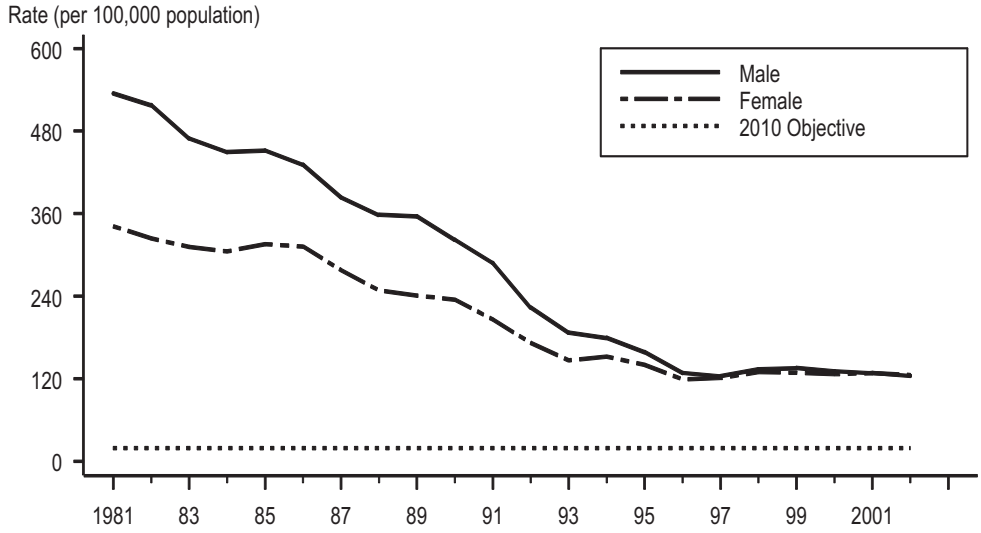


Figure 15. Gonorrhea — Rates by race and ethnicity: United States, 1981–2002 and the Healthy People 2010 objective

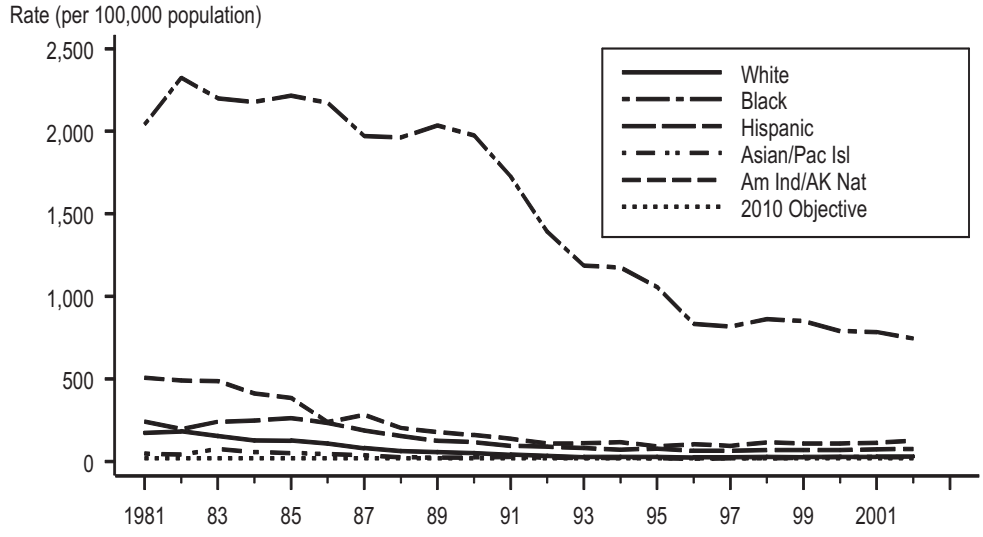
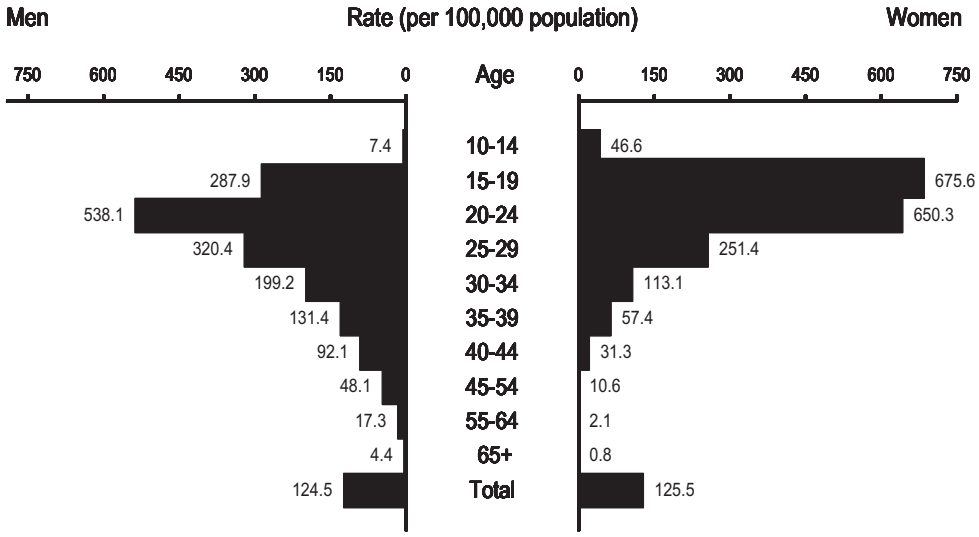
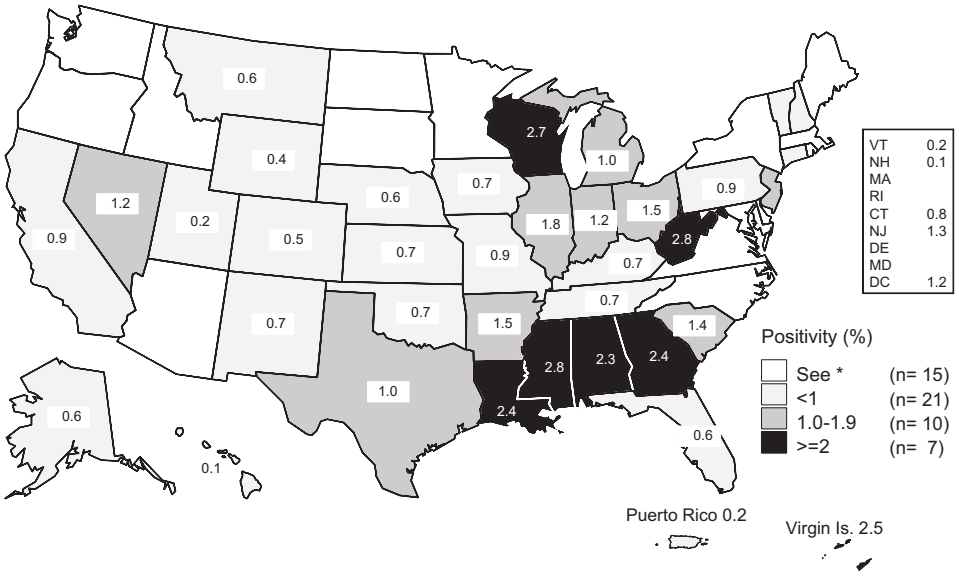


Figure 16. Gonorrhea — Age- and sex-specific rates: United States, 2002



Note: See Table 21.

Figure 17. Gonorrhea — Positivity among 15-24 year old women tested in family planning clinics by state: United States and outlying areas, 2002



*States reported gonorrhea positivity data on less than 500 women aged 15-24 years during 2002, except for Pennsylvania and Puerto Rico which submitted gonorrhea positivity data for April - December 2002 only.

SOURCE: Regional Infertility Prevention Projects; Office of Population Affairs; Local and State STD Control Programs; Centers for Disease Control and Prevention

Figure 18. Gonococcal Isolate Surveillance Project (GISP) — Location of participating clinics and regional laboratories: United States, 2002

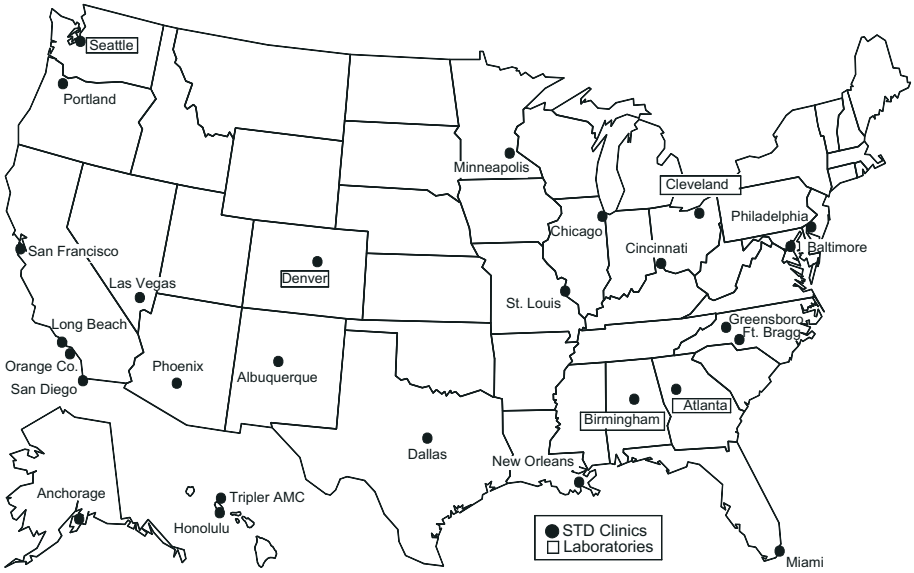
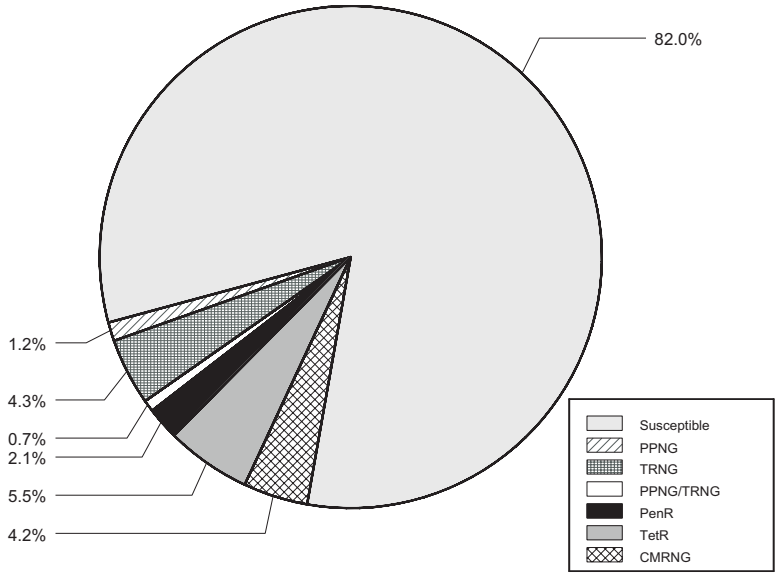
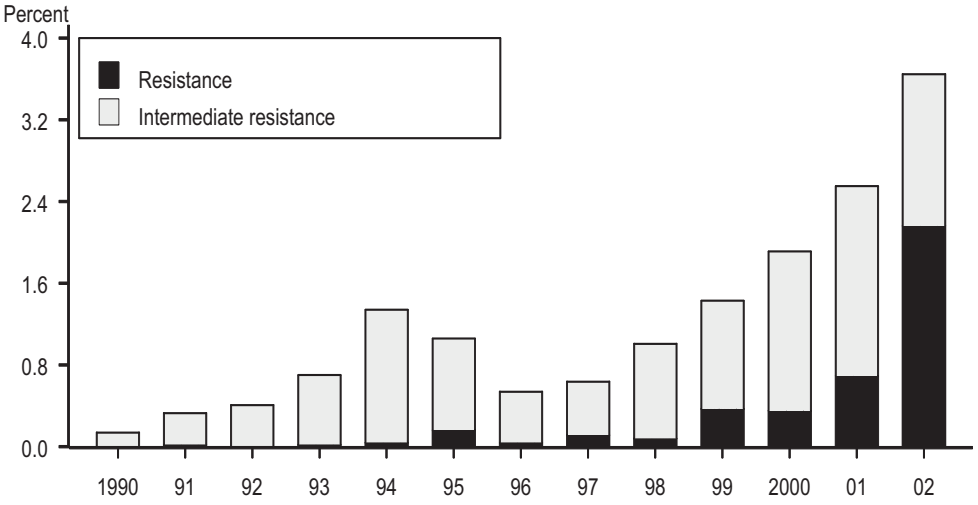


Figure 19. Gonococcal Isolate Surveillance Project (GISP) — Penicillin and tetracycline resistance among GISP isolates, 2002



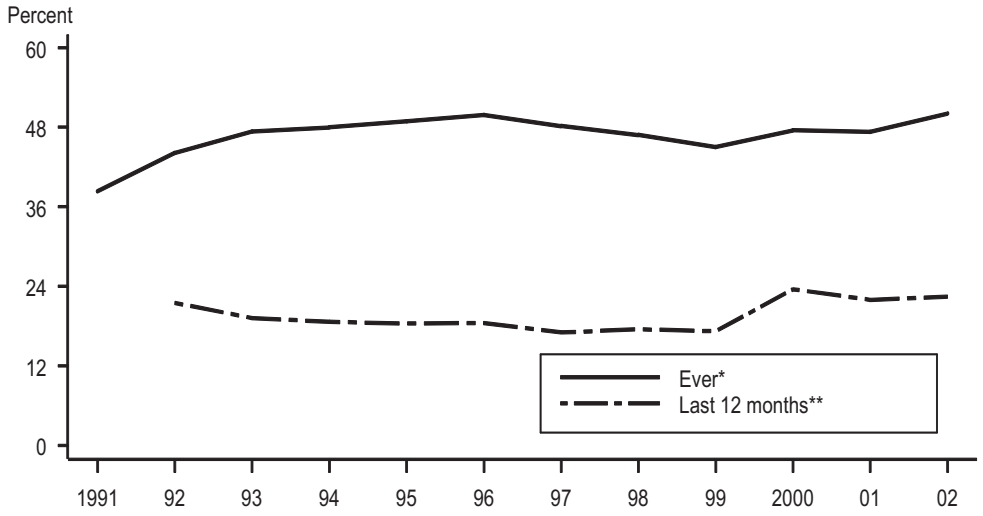
Note: PPNG=penicillinase-producing *N. gonorrhoeae;* TRNG=plasmid-mediated tetracycline resistant *N. gonorrhoeae;* PPNG-TRNG=plasmid-mediated penicillin and tetracycline resistant *N. gonorrhoeae;* PenR=chromosomally mediated penicillin resistant *N. gonorrhoeae;* TetR= chromosomally mediated tetracycline resistant *N. gonorrhoeae;* CMRNG=chromosomally mediated penicillin and tetracycline resistant *N. gonorrhoeae.*

Figure 20. Gonococcal Isolate Surveillance Project (GISP) — Percent of *Neisseria gonorrhoeae* isolates with resistance or intermediate resistance to ciprofloxacin, 1990–2002



Note: Resistant isolates have ciprofloxacin MICs ≥ 1 μg/ml. Isolates with intermediate resistance have ciprofloxacin MICs of 0.125 - 0.5 μg/ml. Susceptibility to ciprofloxacin was first measured in GISP in 1990.

Figure 21. Gonococcal Isolate Surveillance Project (GISP) — Percent of men with gonorrhea who had a previous gonorrhea infection, 1991–2002



*Data first collected in 1991.

**Data first collected in 1992.